**Settlements & Billing**

Configuration Guide: Spinning Reserve Obligation Settlement

**CC 6194**

 Version 5.3

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# Purpose of Document

The purpose of this document is to capture the business and functional requirements for the *CC 6194 – Spinning Reserve Obligation Settlement* charge code configuration.

# Introduction

## Background

The CAISO will procure the Ancillary Services, Regulation Up, Regulation Down, Spinning Reserve, and Non-Spinning Reserve in the Day Ahead Integrated Forward Market (IFM) and procure incrementally as needed in the Real-Time Market (RTM). Ancillary Services (AS) are procured simultaneously with Energy Bids to meet Regulation and Operating Reserve requirements, using submitted Ancillary Service bids. IFM is performed for each hour of the next Trading Day. The Fifteen Minute Market (FMM) performs unit commitment and AS procurement, if needed, at 15-minutes intervals for the current hour and next Trading Hour. The AS awards published for the first 15-minute interval of the time horizon are binding, the rest are advisory. The AS Pricing and Settlement will be based on Ancillary Service Marginal Prices (ASMP), which are calculated for each AS region for each market time interval for each market.

The AS procurement cost is the payment for AS Awarded bids in the Day Ahead IFM and RTM. The Day Ahead and Real-Time Ancillary Services Capacity Settlement Charge Codes are a family of Charge Codes for payment to Scheduling Coordinators (SCs) for Awarded Ancillary Services Capacity bids: (1) Regulation Up, (2) Regulation Down, (3) Spinning Reserve, and (4) Non-Spinning Reserve.

The fundamental concepts of the Settlement methodology for allocation of AS procurement cost to scheduling coordinators are as follows:

* The AS procurement cost allocation for all AS commodity types is hourly, system-wide, and across the IFM and Real-Time Markets
* The cost of procuring the AS by the CAISO on behalf of the demand will be allocated to the demand using a system-wide user rate. The user rate is the average cost of procuring a type of AS in both the forward and Real-Time Markets for the whole CAISO system
* The rate for each AS incorporates the No Pay/Non Compliance Capacity and the No Pay/Non Compliance Charge to reflect the ultimate average AS cost
* The rate for each AS reflects an average AS substitution to capture the cascaded AS procurement as it is performed optimally in each AS market. For example, Settlements reflects that multiple service types are procured and substituted simultaneously during the IFM optimization
* The difference between total net AS Requirements and total AS Obligations results in a neutrality adjustment for each Scheduling Coordinator for each of the Regulation Up, Regulation Down, Spinning Reserve, and Non-Spinning Reserve AS types.
* The difference between total AS Procurement and total AS Requirements over all Spinning, Non-Spinning and Regulation Up Ancillary Services results in a single neutrality adjustment for all these services.
* Ancillary Services awards from Intertie Resources are charged explicitly for the Marginal Cost of Congestion on the relevant inter-tie interface at the relevant Shadow Price. The cost of AS Congestion Charges is not recovered through the AS cost allocation, but is settled in the RT Congestion Offset.

By design, the AS settlement methodology has the following property: If the total AS Procurement matches the total AS Requirements, and if the AS Requirement matches the total AS Obligation for each AS, the AS Cost Allocation is neutral.

By reflecting AS substitution in the AS Rates, this AS Settlement methodology eliminates any neutrality loss due to AS substitution and results in an equitable AS Cost Allocation to Scheduling Coordinators that Self-Provide AS, since there is no AS substitution among Self-Provided AS.

This Charge Code deals with Spinning Reserve Obligation Settlement.

## Description

The Spinning Reserve Obligation Settlement charges Scheduling Coordinators for the cost of its Spinning Reserve Obligation that was not self-provided by the Scheduling Coordinator in the Day Ahead and Real-Time markets.

The Settlements system calculates Spinning Reserve Obligation charge amount by hour by Scheduling Coordinator. Charges are calculated as the product of the calculated Spinning Reserve rate and the Net Spinning Reserve Obligation. The Net Spinning Reserve Obligation is calculated as the difference between the Spinning Reserve Obligation and the Effective Qualified Self-Provision where the Effective Qualified Self-Provision does not exceed Spinning Reserve Obligation. The Spinning Reserve rate is calculated based on the cost of Spinning Reserve procured to meet the Spinning reserve requirements and cost of any Regulation Up Substitution procured to meet Spinning Reserve requirements.

# Charge Code Requirements

## Business Rules

| Bus Req ID | Business Rule |
| --- | --- |
| 1.0 | The Spinning Reserve Obligation charge amount should be calculated by hour by Scheduling Coordinator.  |
| 2.0 | Spinning Reserve Obligation charges should be calculated as the product of Spinning Reserve rate and the Net Spinning Reserve Obligation. |
| 2.1 | The Net Spinning Reserve Obligation should be calculated as the difference between the Spinning Reserve Obligation and the Effective Qualified Self-Provision where the Effective Qualified Self-Provision does not exceed Spinning Reserve Obligation. |
| 2.2 | The Spinning Reserve rate should be calculated as the ratio of the cost of Spinning Reserve procured to meet the Spinning Reserve requirements and costs of any Regulation Up substitution procured to meet Spinning Reserve requirements over Spinning Reserve procured to meet the Spinning Reserve requirements and any Regulation Up substitution procured to meet Spinning Reserve requirements.  |
| 2.3 | The CAISO Hourly Total Spinning Reserve procurement cost should be calculated as sum of the Spinning Reserve procurement costs in Day Ahead and Real-Time markets, as well as the Non-Compliance Costs associated with these markets. |
| 3.0 | For adjustments to the Charge Code that cannot be accomplished by correction of upstream data inputs, recalculation or operator override Pass Through Bill (PTB) Charge logic will be applied. |

## Predecessor Charge Codes

| Charge Code/ Pre-calc Name |
| --- |
| Ancillary Services Pre-calculation |
| Day Ahead Spinning Reserve Capacity Settlement (CC 6100) |
| Real Time Spinning Reserve Capacity Settlement (CC 6170) |
| No Pay Spinning Reserve Settlement (CC 6124) |
| Regulation Up Obligation Settlement (CC 6594) |

## Successor Charge Codes

| Charge Code/ Pre-calc Name |
| --- |
| Ancillary Services Upward Neutrality Allocation (CC 6090)  |
| Spinning Reserve Neutrality Allocation (CC 6196) |
| Non-Spinning Reserve Obligation Settlement (CC 6294) |

## Inputs – External Systems

|  |  |  |
| --- | --- | --- |
| Row # | Name | Description |
| 1 | PTBChargeAdjustmentObligationSpinBQ’Jmdh | Spinning Reserve Obligation PTB Charge Adjustment Amount (in $) for a given Business Associate and Trading Hour. |

## Inputs - Predecessor Charge Codes or Pre-calculations

| Row # | Name | Predecessor Charge Code/ Pre-calc Configuration |
| --- | --- | --- |
| 1 | CAISOHourlyTotalSpinNetProc Q’mdh | Ancillary Services Pre-calculation  |
| 2 | BAHourlyTotalSpinEQSP BQ’mdh | Ancillary Services Pre-calculation  |
| 3 | ScaledHourlyTotalSpinNetReq Q’mdh | Ancillary Services Pre-calculation |
| 4 | CAISOHourlyTotalRegUpNetProc Q’mdh | Ancillary Services Pre-calculation  |
| 5 | ScaledHourlyTotalRegUpNetReq Q’mdh  | Ancillary Services Pre-calculation |
| 6 | SpinObligMW BQ’mdh  | Ancillary Services Pre-calculation |
| 7 | BAHrlyResourceDayAheadSpinSettlementCurrentAmountBrtuT’I’Q’M’VL’W’R’F’S’mdh  | Day Ahead Spinning Reserve Capacity Settlement (CC 6100) |
| 8 | PTBBAHrlyDayAheadSpinSettlementPTBCurrentAmountBQ’Jmdh | Day Ahead Spinning Reserve Capacity Settlement (CC 6100) |
| 9 | BAHrlyResourceRealTimeSpinSettlementCurrentAmountBrtuT’I’Q’M’VL’W’R’F’S’mdh  | Real Time Spinning Reserve Capacity Settlement (CC 6170) |
| 10 | PTBBAHourlyRealTimeSpinSettlementPTBCurrentAmountBQ’Jmdh | Real Time Spinning Reserve Capacity Settlement (CC 6170) |
| 11 | BAHrlyResourceNoPaySpinSettlementCurrentAmount BrtuT’I’Q’M’VL’W’R’F’S’mdh  | No Pay Spinning Reserve Settlement (CC 6124) |
| 12 | PTBBAHrlyNoPaySpinSettlementPTBCurrentAmount BQ’Jmdh | No Pay Spinning Reserve Settlement (CC 6124) |
| 13 | RegUpRatemdh  | Regulation Up Obligation Settlement (CC 6594) |

## CAISO Formula

### SpinObligAmount BQ’mdh

SpinObligAmount BQ’mdh = SpinObligQuantity BQ’mdh \* SpinRate mdh

Where SpinObligQuantity BQ’mdh is defined as

SpinObligQuantity BQ’mdh = min(SpinObligMW BQ’mdh, Max (0, SpinObligMW BQ’mdh - BAHourlyTotalSpinEQSP BQ’mdh) )

And where SpinRate mdh is defined via

IF SpinCascadeProc Q’mdh > 0 THEN

SpinRatemdh = Sum over (Q’) ( RegUpRatemdh \* RegUpSubsSpinProc Q’mdh + SpinRateSpinmdh \* SpinSubSpinProc Q’mdh ) /SpinCascadeProc Q’mdh

Else

SpinRatemdh = 0

In which SpinCascadeProc Q’mdh is defined as

SpinCascadeProc Q’mdh = RegUpSubsSpinProc Q’mdh + SpinSubSpinProc Q’mdh

In which RegUpSubsSpinProc Q’mdh is defined as

RegUpSubsSpinProc Q’mdh = Max (0, CAISOHourlyTotalRegUpNetProc Q’mdh – ScaledHourlyTotalRegUpNetReq Q’mdh)

And SpinSubSpinProc Q’mdh is defined as

SpinSubSpinProc Q’mdh = Max (0, ScaledHourlyTotalSpinNetReq Q’mdh –RegUpSubsSpinProc Q’mdh)

And where SpinRateSpin mdh is defined via

IF CAISOHourlyTotalSpinNetProc Q’mdh > 0

THEN

SpinRateSpinmdh =Sum over (Q’)CAISOHourlyTotalSpinCost Q’mdh / CAISOHourlyTotalSpinNetProc Q’mdh

Else

SpinRateSpinmdh = 0

In which CAISOHourlyTotalSpinCost Q’mdh is defined as

CAISOHourlyTotalSpinCost Q’mdh = (-1) \* (CAISOHrlyDayAheadSpinSettlementAmount Q’mdh + PTBCAISOHrlyDayAheadSpinSettlementPTBAmount Q’mdh + CAISOHrlyRealTimeSpinSettlementAmount Q’mdh + PTBCAISOHourlyRealTimeSpinSettlementPTBAmount Q’mdh + CAISOHrlyNoPaySpinSettlementAmount Q’mdh + PTBCAISOHrlyNoPaySpinSettlementPTBAmount Q’mdh)

CAISOHrlyDayAheadSpinSettlementAmount Q’mdh =

Sum over (B, r, t, u, T’, I’, M’, V, L’, W’, R’, F’, S’)

 BAHrlyResourceDayAheadSpinSettlementCurrentAmount BrtuT’I’Q’M’VL’W’R’F’S’mdh

PTBCAISOHrlyDayAheadSpinSettlementPTBAmount Q’mdh = Sum over (B, J)

 PTBBAHrlyDayAheadSpinSettlementPTBCurrentAmount BQ’Jmdh

CAISOHrlyRealTimeSpinSettlementAmount Q’mdh = Sum (B, r, t, u, T’, I’, M’, V, L’, W’, R’, F’, S’)

BAHrlyResourceRealTimeSpinSettlementCurrentAmount BrtuT’I’Q’M’VL’W’R’F’S’mdh

PTBCAISOHourlyRealTimeSpinSettlementPTBAmount Q’mdh = Sum over (B, J)

 PTBBAHourlyRealTimeSpinSettlementPTBCurrentAmount BQ’Jmdh

CAISOHrlyNoPaySpinSettlementAmount Q’mdh = Sum over (B, r, t, u, T’, I’, M’, V, L’, W’, R’, F’, S’)

 BAHrlyResourceNoPaySpinSettlementCurrentAmount BrtuT’I’Q’M’VL’W’R’F’S’mdh

PTBCAISOHrlyNoPaySpinSettlementPTBAmount Q’mdh= Sum over (B, J)

 PTBBAHrlyNoPaySpinSettlementPTBCurrentAmount BQ’Jmdh

## Outputs

.

| Row # | Name | Description |
| --- | --- | --- |
|  | In addition to the outputs listed below, all inputs shall be included as outputs. |  |
| 1 | SpinObligAmount BQ’mdh | Spinning Reserve Obligation charge amount (in $) due ISO for a given Business Associateand Trading Hour**.** |
| 2 | SpinObligQuantity BQ’mdh | Total Spinning Obligation Quantity (in MW) for a given Business Associate and Trading Hour. |
| 3 | SpinRatemdh  | Spinning Reserve charge rate (in $/MW) for a given Trading Hour. |
| 4 | SpinCascadeProc Q’mdh | Spinning Reserve (in MW) cascaded procurement for a given Trading Hour**.** |
| 5 | RegUpSubsSpinProc Q’mdh | Regulation Up capacity (in MW) substituted for Spinning Reserve procurement for a given Trading Hour. |
| 6 | SpinSubSpinProc Q’mdh  | Spinning Reserve procured for Spinning Reserve (in MW) for a given Trading Hour*.* |
| 7 | SpinRateSpinmdh | Spinning Reserve procured for Spinning Reserve charge rate (in $/MW) for a given Trading Hour. |
| 8 | CAISOHourlyTotalSpinCostQ’mdh  | CAISO Total Spinning Reserve cost (in $) for a given Trading Hour**.** |
| 9 | CAISOHrlyDayAheadSpinSettlementAmountQ’mdh | This formula exists solely to derive a CAISO Amount by BAA\_ID (Q’), Input from CC 6100.  |
| 10 | PTBCAISOHrlyDayAheadSpinSettlementPTBAmount Q’mdh | This formula exists solely to derive a CAISO Amount by BAA\_ID (Q’). Input from CC 6100.  |
| 11 | CAISOHrlyRealTimeSpinSettlementAmount Q’mdh | This formula exists solely to derive a CAISO Amount by BAA\_ID (Q’). Input from CC 6170.  |
| 12 | PTBCAISOHourlyRealTimeSpinSettlementPTBAmount Q’mdh | This formula exists solely to derive a CAISO Amount by BAA\_ID (Q’). Input from CC 6170. |
| 13 | CAISOHrlyNoPaySpinSettlementAmount Q’mdh | This formula exists solely to derive a CAISO Amount by BAA\_ID (Q’). Input from 6124. |
| 14 | PTBCAISOHrlyNoPaySpinSettlementPTBAmount Q’mdh | This formula exists solely to derive a CAISO Amount by BAA\_ID (Q’). Input from 6124. |

# Charge Code Effective Date

| Charge Code/Pre-calc Name | Document Version | Effective Start Date | Effective End Date | Version Update Type |
| --- | --- | --- | --- | --- |
| Spinning Reserve Obligation Settlement (CC 6194) | 5.0 | 04/01/09 | 04/31/14 | Documentation Edits Only |
| Spinning Reserve Obligation Settlement (CC 6194) | 5.1 |  5/1/14 |  9/30/14 | Configuration Impacted |
| Spinning Reserve Obligation Settlement (CC 6194) | 5.2 | 10/01/14 | 10/31/18 | Configuration Impacted |
| Spinning Reserve Obligation Settlement (CC 6194) | 5.2a | 11/01/18 | 4/30/26 | Documentation Edits Only |
| Spinning Reserve Obligation Settlement (CC 6194) | 5.3 | 5/1/26 | Open | Configuration Impacted |